The Effect

of

the Non-Domestic Employment

of Women

upon their Maternal Functions.

By

Adam White, M.B.,Ch.B., D.T.M. & H., D.P.H.,
Medical Officer of Health, Borough of Newcastle-under-lyme and Wolstanton United Urban District.

1924

Introduction.

The effect of the non-domestic employment of women upon their functions as mothers is of particular importance at the present time on account of the large number of women engaged in such employment, and on account of the large proportion in death returns of deaths of children under one year of age. Although infantile mortality has fallen very considerably during the last half century, its present height is of such a degree as to call for continued and indeed increased efforts towards it's reduction. On the other hand, however, if efforts directed towards the reduction of infantile mortality are to produce the best results it is necessary that factors causing infantile mortality should be accurately known and assessed so that time and energy may not be expended in attacking conditions which have little or no effect on the infantile death-rate. This investigation has therefore been undertaken with the object of assessing, as far as possible, the influence of the non-domestic employment of women upon their maternal functions.

The subject has been considered under the following heads:-

1. Historical points regarding the employment of women.
2. Reasons underlying the non-domestic employment of women under modern conditions.

3. The effect of non-domestic employment upon the health, morbidity, and mortality of women.

4. The effect of the non-domestic employment of women upon the marriage-rate and birth-rate and upon pregnancy and infantile mortality.

1. Historical Points regarding the employment of women

This aspect of the subject, the degree of industrial employment of women in former times, has been investigated by W. I. Thomas (1), Havelock Ellis (2), Sir G. J. Fraser (3), E. Lipson (4), J. R. Green (5), T. E. Thorold Rogers (6), and A. Abram (7); and a very useful summary of the evidence brought forward by these authors is presented by E. L. Collis and M. Greenwood (8, page 213 et.seq.)

The general trend of the evidence of the authors quoted above is to the effect that from the very earliest times women have taken a considerable share in industrial life and that they actually originated industry by beginning the working up of the products of the chase which were the results of man's hunting activities.

W. L.Thomas (1, pp 228-232) bears testimony to

the primacy held by women in industry when he says "Man represented the more violent and spasmodic activities, involving motion and skilful co-ordinations as well as organisation for hunting and fighting, while woman carried on the steady, settled life. She was not able to wander readily from a fixed point, on account of her children; and, indeed, her physical organisation fitted her for endurance rather than movement. Consequently her attention was turned to industries, since these were compatible with settled and stationary habits. Agriculture, pottery, weaving, tanning and all the industrial processes involved in working up the by-products of the chase, were developed by her. She domesticated man and assisted him in domesticating the animals.....In the course of time, however, an important change took place in environmental conditions. While woman had been doing the general work and had developed the beginnings of many industries, man had become a specialist along another line. His occupation had been almost exclusively the pursuit of animals or conflict with his neighbours, and in this connection he had become an inventor of weapons and traps, and in addition had learned the value of acting in concert with his companions. But a hunting life cannot last for ever; and when large game began to be exhausted, man found himself forced to abandon his destructive and predaceous

activities, and adopt the settled occupations of woman. To these he brought all the inventive technique and capacity for organised action which he had developed in his hunting and fighting life, with the result that he became the master of woman in a new sense. Not suddenly but in the course of time, he usurped her primacy in the industrial pursuits, and through his organisation of industry and the application of invention to the industrial processes became a creator of wealth on a scale before unknown.....Among peasants, also, and the plain people the proverb recognises that the 'gray mare is the better horse'. The heavy, strong, enduring patient, often dominant type frequently seen among the lower classes, where alone woman is still economically functional, is probably a good representive of what the women of our race were before they were reduced by man to a condition of parasitism which, in our middle and so-called higher classes, has profoundly affected their physical, mental and moral life."

A quotation from Antipater extracted by Collis & Greenwood (8, page 3) shews that the Romans employed women to turn mill stones and in the time of the Roman occupation the manufacture of linen and woolen articles was carried on to such a degree by women that a place where such work was done was known as a gyneceum (9).

E. Lipson (4, page 300) shews that as early as

the year 1264 women weavers and wool wrappers were employed at Leicester, and the same author (4, page 316) indicates that women in the middle ages were extensively engaged as brewers, weavers, spinners, dyers, etc. A. Abram (7) compares the position of women to-day with her position in the later Middle Ages and expresses the opinion that a larger proportion of women of that time than of women of the present day were engaged in agricultural and rough unskilled labour. Up to the year 1842 women were extensively employed in coal mines and they worked in the Derbyshire lead mines certainly from the time of Edward 11. up to the 18th century. They were also extensively employed in the plated ware trade at Sheffield and in the potting industry in Burslem.

The foregoing short summary shews conclusively that women were engaged in heavy industrial work long before the so-called industrial revolution, and that there is no reason to believe that the factory employment of women at the present day is harder than that to which they have been accustomed since early times. It is highly desirable to bear this in mind when one is attempting to assess the effect of the employment of women upon their functions as mothers.

2. Reasons underlying the non-domestic employment of women under modern conditions.

This aspect of the subject may be looked at from three points of the view:-

A. The Interests of the State.

B. The Interests of Industry.

C. The Interests of women themselves.

A. The Interests of the State.

No community existing under modern conditions can afford to leave half its population unproductive. While it may be argued that the prime function of woman is marriage and motherhood and that everything possible should be done to fit woman for this function and to place her in as favourable a condition as possible for its exercise, the fact remains that a large number of women do not marry and therefore it may be legitimately advanced that as these women do not contribute to the good of the State by the production of children they should be expected to advance the common weal in some other manner. Production is the only sound economic basis of wealth and if employment of women increases production without interfering with their functions as mothers such employment will materially contribute to the good of the State.

The necessity for increased production of commodities is especially marked at the present time.

The European War 1914 to 1918 caused directly and indirectly destruction on a vast scale, and in addition prevented production. The adverse balance produced by the war can be rectified only by speeding up production. No other method will create a sufficiency of commodities and a sufficiency of commodities is the one and only factor which will reduce the cost of living and lead to the creation and maintenance of a reasonable standard of economically sound comfort.

B. The Interests of Industry.

Women as a class are the possessors of certain definite characteristics which are of value to present day industry particularly on account of the tendency of such industry to specialisation and repetition work. As a class women are more industrious than men and it is generally held that they have an innate tendency to continue steadily at constant repetition work which would be regarded as monotonous by men. As a body they look forward to matrimony rather than to a life of industrial employment, and so, not desiring to apprentice themselves to skilled trades, they are available for unskilled employment. Taking up industry not with the object of making it their life's work but only in order to fill in the time until they are married, they do not expect such large wages as men and therefore their employment benefits industry by lowering the cost of production.

C. The Interests of Women themselves

Rhoda Adamson (10) makes the point that in some localities employment of women is customary. Such localities are of course those in which there are industries making a great demand for female labour. In localities of this type many of the women continue after marriage at the same trades which employed them while unmarried because they prefer non-domestic employment to which they are accustomed rather than the routine of housework to which they are unaccustomed, and partly also perhaps because they can marry earlier if the house contains two breadwinners. Adamson divides working mothers into (1) those who go out to work when there is no economic necessity, and (2) those who go out to work because there is economic necessity. She considers that most married women really prefer to remain at home and that the industrial employment of such women is, in the majority of cases, due to economic necessity.

John Robertson (11) in a report on industrial employment of married women and infant mortality (which report will be alluded to at greater length when we are discussing the infantile death-rate) found that of all industrially employed mothers in the area of his investigation 84.62 per cent. went to work in order to supplement a small income, 12.33 per cent. were the sole or main source of the family income, and only 3.04 per cent. went out to work on account of personal preference.

The large influence exercised by economic necessity is particularly evident in Robertson's figures.

George Reid (12) in speaking of an investigation which he made into the effect of the industrial employment of married women upon infant mortality (which investigation will also be dealt with more fully later on) stated that the mothers in his series who engaged in factory work did so from inclination and not from necessity.

A. Louise McIlroy (13) says in speaking of the employment of women under modern conditions " It is no longer a disgrace for a woman to earn her own living or to maintain her family by her work. In many cases the father is disabled or cannot find employment, and the main burden of the support of the family falls on the woman. The strain and anxiety involved in making ends meet may be just bearable if the woman can retain her profession or trade, and the financial advantage will make all the difference to the happiness and harmony of the home. The children will be enabled to have a better start in life."

Julia C. Lathrop (14) in a paper read before the Sociological Section of the American Public Health Association shews a lessening proportion of mothers employed as the husband's wage increases. For example in Manchester, New Hampshire, 65.7 per cent. of mothers whose husbands earned less than 550 dollars were gainfully employed during the first year following

a baby's birth, while only 9.5 per cent. of the mothers whose husbands earned more than 1250 dollars were so employed.

Sir Thomas Oliver (15) sums up the position thus:- "Is the employment of female labour to the extent it is carried on to-day a gain to the race? Women's place in labour is now a recognised fact and there is little doubt that it has come to stay. Experience during the war shewed that work which had been regarded as plysically too hard for women could, after a few weeks or a few months of training, be undertaken without output falling away to any extent, if at all. Women's success in some of the so-called highly skilled trades shewed that the long apprenticeship insisted upon by the men was not absolutely necessary. There are limitations to women's work just as there are to men's, and while it is generally admitted that men's output is greater, there are yet certain types of work, repeat work for example, in which women will produce as much as men and the character of the work be just as good. While I maintain that the home is a woman's special field and what nature intended her for, also that where a woman has a family her duty is primarily to her children, yet since there is a surplus of women in this country for whose activities an outlet must be provided, then to women must be given the opportunity for work and the right to earn adequate wages."

3. The effect of non-domestic employment upon the health, morbidity, and mortality of women.

A. The general mortality and morbidity of women.

B. Physical Capacity.

C. The Blood.

(a) General.

(b) Anaemia.

D. Menstruation.

E. Hernia and Displacements of the Uterus.

F. Varicose Veins and Flat Foot.

G. Nutrition.

H. Psycological Functions.

I. The effects of Lead upon the Health of Women.

Is there anything in the physical or mental make-up of women which unfits them for non-domestic employment in general, and if this question is answered in the negative are there any particular types of employment for which they are not suited?

A. The General Mortality and Morbidity of Women.

Although mortality figures justify the contention that woman (possessing, as she does, according to such figures greater longevity) is more resistant to death than is man, the greater wear and tear of the life of the male has been advanced as the cause of

his relative inferiority in this respect. But those who advance this explanation have apparently forgotten that the superior position possessed by the female is fully evident in the first year of life (male infant mortality being greater than female) and continues throughout life at all ages except from 10 to 15 and at the age period 85 and upwards. The following table (16) shews for the years 1920 and 1921 the mortality of males of various ages per cent. of that of females of like age.

England and Wales ; Mortality of Males of Various Ages per cent. of that of Females of Like Age.

	All Ages	0-	5-	10-	15-	45-	55-	65-	75-	85 & upwards
1920	123	125	102	94	121	140	129	124	116	96
1921	121	125	103	97	116	139	130	121	114	95

There cannot be much if any difference in the activities of and the wear and tear experienced by the two sexes at ages under 10, and as the female possesses a relative superiority at these ages excessive wear and tear cannot logically be advanced as a cause of the inferiority of the male at most ages.

While, therefore, mortality statistics indicate that on the whole women resist fatal disease more

efficiently than do men, there exist in this country few reliable data from which the effect of non-domestic employment upon the mortality of women can be gauged. This is at least in part due to the lack of continuity of woman's non-domestic employment. A considerable number of women who are employed prior to marriage cease to be so employed when they marry. A certain proportion return to non-domestic employment later in married life or during widowhood, but in many such cases the employment then taken up is not the same as that in which they engaged prior to matrimony.

If mortality data are of no assistance to us, morbidity statistics on the other hand, do definitely shew that employed women suffer more sickness than do similarly employed males and that cases of sickness in working women are on the average more prolonged than cases of sickness in employed men.

Sir Thomas Oliver (17) says " Generally speaking it may be said that when women have to earn their own living they exhibit a higher sick-rate than men engaged in the same trade. British statistics supply less information on this point than do German. In Stettin, 1902-1903, also 1908-1909, the sick-rates in the case of male teachers were 2.8 and 5 respectively; for female teachers they were 6.4 and 10.3; as regards days lost through sickness during 1904 and 1905, and 1908 and 1909. male teachers lost 6.7 days and female teachers 14.8."

The same author quotes figures from Prinsing and from the Leipsiz Insurance Fund Statistics which shew that the amount of sickness among employed women is greater than the amount experienced by similarly occupied males.

Oliver also gives the following figures which shew, for various age groups, comparisons of male and female sickness rates of persons similarly employed.

Ages	Per 100 persons cases of sickness.		Days of sickness per individual.	
	Male	Female	Male	Female
Under 15 years	38.0	29.0	5.9	5.5
15 - 20 "	37.6	36.4	6.3	8.0
20 - 25 "	36.3	42.1	6.9	10.4
25 - 35 "	38.0	50.2	8.0	14.2
35 - 45 "	44.3	55.3	11.0	16.7
45 - 55 "	51.7	54.3	14.9	16.9
55 - 65 "	60.2	54.9	21.2	19.6
65 - 75 "	75.7	66.6	33.2	27.4

The above figures shew generally that females are inferior to males as regards sickness from the age of 20 to the age of 55, that is roughly during the period of a woman's reproductive activity.

To sum up the position as regards mortality and morbidity we may conclude that:-

1. At practically all ages females shew a lower mortality than do males.
2. This statistical fact exists in spite of the considerable degree of non-domestic employment of females which obtains at the present

time.

3. Although employed females shew a higher sickness rate than do males similarly employed, the sickness must be of a relatively trivial character, since the mortality of males is higher than that of females.

4. As the age period at which the female is relatively inferior to the male, so far as morbidity is concerned, is practically co-terminous with the period of menstrual and reproductive activity, due allowance for these functions in their relation to loss of time at work would probably shew that the female is not otherwise really inferior to the male.

It may reasonably be anticipated that education regarding the menstrual function and proper supervision of expectant employed mothers would lead to a reduction in the loss of working time which is associated with the menses and pregnancy.

B. Physical Capacity.

In proportion to her size and weight, woman does not have the same strength as man. This is brought out in the table presented by Vernon (18) when giving evidence before the War Cabinet Committee on Women in Industry. These tables shew a relative inferiority of women at such strength tests as drawing loads and

pulling a bow.

Collis and Greenwood (8, page 221) say " Where women have been employed on the same work as men, say in brickmaking, their output on the average does not exceed three-fifths that of men, and this proportion probably represents not unfairly the relative physical capacity of the two sexes."

Hope, Hanna, and Stallybrass (19) say "Physically speaking, man is stronger than woman, the relative difference being as much as 43 per cent. as measured by the dynamometer; and as measured by the ergograph, which includes the power of resistance, there is a difference of 39 per cent."

W. I. Thomas (1,page 21) quotes figures relating to various forms of athletic achievement (racing, jumping, golf driving, swimming) which shew that women do not attain the same standard as do men in such exercises.

Looking at this aspect of the question from the point of view of the relative liability to fatigue of the two sexes, Collis and Greenwood (8, page 222) hold that it is an open question whether women working at their own natural level tire sooner than do men working at their natural level.

Ellis (2) quoted by Collis and Greenwood says " When women are working at their own natural level of energy they tire less quickly than men do when working

at their natural level of energy; but when women attempt to work at the masculine level of energy they tire very much more rapidly than men."

Hope, Hanna, and Stallybrass (19) in summarising the Report of the Committee on the Health of Munition workers, say " It was found that as regards serious fatigue, the incapacity for work was small, approximating 5 to 6 per cent of those examined. Slight fatigue approximated to 20 to 50 per cent, depending on the character of the work " and that fatigue is almost wholly due to fatigue of the nervous system. The Committee concluded that " In spite of long hours and arduous labour, there is no doubt that much fatigue is reduced or removed by active incentives to labour, such as interest, a sense of patriotism, high wages, and a great improvement in factory conditions." It is therefore apparent that fatigue is generally due in a large measure to conditions which are not necessarily inherent in industrial employment as such and which, moreover are remediable.

C. The Blood.

(a) General.

The number of red corpuscles is less in women than in men, the relative proportion being as 55-60 (20, page 228) the iron content of these is less (as.04 -.05), and the specific gravity of the blood is lower.

Collis and Greenwood (8, page 224) say "Evidence

.....with respect to the blood points to the woman being rather less fitted than man for a life of physical activity and bursts of energy, but the data are far too scanty to warrant firm conclusions."

(b) Anaemia

Chlorosis is a form of anaemia which is almost confined to females and which is seen especially between the ages of 14 and 20. Its prominent symptoms being shortness of breath, tiredness, giddyness and fainting, it causes a marked fall in efficiency in anyone suffering from it. Its incidence is particularly associated with "constipation.....poor air, overwork, and food deficient in iron " (21, page 606)

There is no doubt that chlorosis is a rarer disease now than it was formerly. With regard to the general fall in the incidence of this disease Gulland and Goodall (22) say " There seems to be little doubt that chlorosis is becoming a less frequent condition than formerly. This may be ascribed to improved hygienic conditions in the kitchen and in the factory, and to the passing of the sampler and the "accomplishments" in favour of outdoor sports among girls higher in the social scale."

Hope, Hanna, and Stallybrass (19) say " Anaemia is common in ill-fed, overworked girls whose surroundings both at home and at work are unhygienic.

Improved diet and more healthy factory conditions have largely diminished this condition and do more than direct medical treatment."

While chlorosis was formerly specially common among young domestic servants, it has never been common among factory operatives (8, page 227) and the quotation from Gulland and Goodall shews that in the years prior to the war of 1914-1918 the disease shewed a marked fall in all types of employed women. In a personal communication of recent date Dr Goodall informs me that this fall is still in evidence; in other words the fall has still been maintained through the war period, when there was a great increase in the industrial employment of women.

We may therefore say that industrial employment under good hygienic conditions probably makes for a lowered incidence of chlorosis in those employed. A regular life, proper exercise, wholesome food, and fresh air are undoubtedly the individual factors which have operated in the causation of the lowered incidence.

D. Menstruation.

Does the function of menstruation in any degree incapacitate women for non-domestic employment and is this function adversely affected by such employment?

Mock (23, page 422) found dysmenorrhoea to be responsible for 18.9 per cent. of absences from work on account of illness in 15244 cases of sickness in

industrially employed women examined by him.
The following quotation shews the attitude of this author to the subject. " Among concerns employing great numbers of girls this condition of painful menstruation causes an incalculable loss of time from work and decreased efficiency before and after as well as during the periods. The causes of this condition are many. A small percentage are due to anatomical displacements or some pathological change in the generative organs. The majority of the cases, however, are traceable to other conditions more or less remote from the pelvis. Of these, constipation, and the conditions predisposing to this, such as improper food, lack of exercise, etc., is the commonest cause.
A few years ago, many state legislatures endeavoured to improve health conditions among working girls by enacting laws making it necessary for them to sit while at work. In my opinion constant sitting during the long working hours is as bad, if not worse, than constant standing. This sitting posture causes more or less congestion of the pelvic organs which is increased by constipation so often associated with constant sitting. If girls could be persuaded to dress properly and then could be gradually trained to standing and walking for several hours, much healthier employment could be found for them than the sedentary occupations to which they are now condemned, chiefly by legislature. Under the existing conditions,

occupations which allow part-time sitting and part-time standing, or if this is impossible, frequent rest periods which will allow the girls to stand and move about, will be found of the greatest benefit in overcoming dysmenorrhea. The next commonest cause for this condition can be found in an unstable, nervous mechanism. A large percentage of the girls who reported to the doctor's office because of painful menstrual periods also reported at other times because of various nervous manifestations such as fainting, hysteria, "nervousness" and many neurasthenic symptoms. I have submitted hundreds of these girls to through physical examinations (not including vaginal) and many of these have shewn the signs of neurocirculatory asthenia, the long narrow chest with the acute intercostal angle (Stiller type), movable or even floating kidneys especially of the right side, and exaggerated abdominal reflexes. These cases are so common that the nurse who was present at the time of examinations voluntarily remarked about the similarity of the findings. Many girls suffer from neurasthenic symptoms during their periods which are based upon the teaching or on the lack of teaching of the mother. Instead of being told of this normal condition in their sex, they are suddenly frightened to death by its appearance. They are then told to keep quiet, avoid excitement, never bathe and similar instructions, all

of which stimulates fear of consequences and tends to develop the neurasthenic state at each subsequent period. It is imperative that our girls be taught that this is a normal condition and should not be regarded as a "sick time".....The number of girls suffering from dysmenorrhea in the working force can be greatly reduced by systematic efforts directed towards this end by the medical staff. Here the nurse and intelligent foreladies can be of the greatest assistance, in fact they must often take the lead in directing the routine measures suggested by the doctor. The first essential is to decrease the number of cases of constipation to a minimum.....Next, every industry employing girls should provide the means for healthful recreation including games which afford plenty of outdoor exercise. Lectures will be found of great value, but better than this is the careful study of each case of dysmenorrhea followed by individual instructions concerning the methods of overcoming it. The nurses can give these instructions by many intimate talks with the girls. Hot drinks, especially those containing certain food values, combined with a short rest in the rest room, will enable many to return shortly to work whereas medicine given to relieve the pain only tends to create a habit."

It will be seen that Mock emphasises the

importance of constipation, improper food, lack of exercise and constant sitting or standing(particularly the former) in the aetiology of dysmenorrhoea and its frequent association with lack of a proper understanding of the function of menstruation by the individual.

In a paper read before a meeting of the Medical Officers of Schools Association (24) Dr Sanderson Clow makes a strong appeal for the regarding of menstruation as a normal function, for the banishment of the idea that the menstrual period is usually and necessarily associated with a condition of semi-invalidism, for the instruction of pubescent girls and young women in order that they may regard the function as a normal physiological process which is not necessarily disabling, and for the carrying on during the period of the usual activities of life, even to the continuation of strenuous exercise and the taking of the daily bath. Sanderson Clow investigated the menstrual function in 1818 girls, at a school and training centre, whose ages ranged from 11 to 25 years. All these girls were interviewed by Clow and they had impressed upon them her point of view which is outlined above. At the first interview 70 per cent. of the girls stated that they were free from menstrual trouble. After an interview sufficient to allow time for the instruction to bear fruit the girls were questioned again, and it was then

found that the percentage of those free from trouble associated with the menses had risen to 93 per cent. Clow attributes this diminution in semi-invalidism to the keeping up of a proper amount of exercise and to the continuance of warm bathing.

Clow states that in an industrial establishment over 10 per cent. of the women might be expected to report sick on account of menstrual trouble.

At the same meeting Dr C. E. Shelly referred to the fisher women of Brittany who are accustomed to wade out in the surf to the boats to carry ashore the fish and who remain in the market in their wet clothes until their fish are sold. These women are very free from menstrual trouble, from which they suffer practically only during spells of bad weather when their arduous work perforce ceases. Several other medical women who had had considerable experience among school girls also agreed with Clow's point of view.

Dr Sarah Gray (25) has stated her disapproval of the giving up of activities by the menstruating woman, and her belief that exercise might become the recognised treatment for many cases of menorrhagia and dysmenorrhoea.

While, therefore, although we have the statement by Howell (26) quoted by Collis and Greenwood (8, page 225) " At the time of or in the period just preceding the menstrual flow there is usually a more or less marked sense of ill-being or despondency and a

diminution in general efficiency" and although many text books on gynaecology and obstetrics give the impression that suffering during the menstrual period is the rule, there appears little doubt that Howell's statement may be regarded as a propagation of the male originated legend of the periodic incapacity of women, that the writers of the text books are not safe guides in this matter inasmuch as they have come especially in contact with persons diseased and abnormal to the relative exclusion of the healthy and normal, that there is a considerable body of well informed opinion to the effect that menstruation is not as a rule disabling to any appreciable degree and that many troubles which may be associated with it are benefited by exercise.

In the presence of the opinions quoted and in conformity with the general summary given in the preceding paragraph, one must answer the question which opens this subsection by saying that menstruation does not of itself incapacitate the average woman for non-domestic employment of a type for which she is otherwise physically capable, provided the requirements postulated by Mock (23) are fulfilled, and that the menses, far from being prejudicially affected by such employment, may be benefited by an occupation which involves a proper amount of regular exercise.

E. Hernia (Inguinal, Femoral, Umbilical & Vaginal) and Displacements of the Uterus.

These conditions may be considered together as their aetiology is somewhat similar.

With regard to the frequency and causation of hernia Mock (23, page 414) says " Hernia is rare with women; even the femoral type which is the commonest form found in this sex.....In 500 consecutive examinations in a gynaecological dispensary the author found only 5 femoral or inguinal hernias, whereas umbilical and ventral hernias were common. These (i.e., the inguinal and ventral) were chiefly found in older women who had borne children.

Hope, Hanna, and Stallybrass (19) state " The lifting of heavy weights may cause rupture or pelvic prolapse and consequently a woman of average physique should not be required to lift more than 40 to 50 lbs. .....The lifting of heavy weights is the cause of overstrain and hernia, especially the lifting of heavy weights up to and above the head." Collis and Greenwood (8, page 222) after pointing out the relative freedom of women from inguinal hernia summarise the position thus:- "What she gains in this respect, however, the multiparous woman, with relaxed pelvic ligamants, loses from her tendency to procidentia or vaginal hernia, and to umbilical hernia.

This tendency should be guarded against by not employing on heavy work women who have borne several children."

With regard to the aetiology of prolapse of the uterus, gynaecologists generally agree that pregnancy is the chief factor but that, inasmuch as prolapse may sometimes be found in virgins and in married women who have never conceived, childbearing is not the only factor.

Pregnancy occupies it's unenviable position in the causation of prolapse fro the reason that the factors which normally keep the uterus in position are commonly altered by pathological states brought about by childbearing. Nevertheless, somewhat similar pathological conditions to those produced by childbirth in the uterine supports can be produced by hard work, insufficient food, insanitary surroundings and general ill-health acting alone or in various combinations. In connection with childbirth the outstanding combination leading to prolapse is widening of the pelvic floor aperture by tearing or undue stretching of the perineum, subinvolution of the uterus (with it's associated laxity of the ligaments and surrounding connective tissue) and increased intra-abdominal pressure due to straining at defaecation, chronic cough of heavy work such as charing.

The chief factors are probably laxity of the perivascular connective tissue sheaths, widening of the pelvic floor aperture and increased intra-abdominal pressure. Ill-health, insanitary surroundings, starvation, and hard work lead to absorption of fat, relaxation of the perivascular sheaths and lack of tone in the levator ani muscle with widening of the pelvic floor aperture. The hard work supplies the increased intra-abdominal pressure and thus we have prolapse produced in unmarried or non-conceiving women who perform hard manual toil and are insufficiently fed and live in an insanitary environment.

With regard to the causation of backward and forward displacements of the uterus, violent muscular effort may cause backward displacement of the organ when gravid (27, page 93) and anteflexion with abdominal hernia may occur in ill-nourished women who have lax abdominal walls. (27, page 100)

What has been said in the preceding paragraphs will make it clear that nulliparous industrially employed women are specially exempt from inguinal and femoral hernia and that they become prone to prolapse of the uterus only in the presence of excessive strain, bad hygienic surroundings and under-nourishment. Multiparous women on the other hand, while they also are relatively exempt from inguinal and femoral hernia, have a special predisposition to vaginal hernia and to

other displacements of the uterus. Therefore, while no woman should be allowed to attempt manual work beyond her physical capacity, particularly in the presence of under-nourishment and bad surroundings, special means should be taken to prevent excessive weight lifting by the multiparous woman. If such conditions are fulfilled the risk of hernia forms no bar to the non-domestic employment of women.

F. Varicose Veins and Flat-foot.

Varicosity of the veins of the leg is a specially important condition in women inasmuch as the presence of such varicosities at the time of pregnancy increases the chances of the onset of phlebitis and phlegmasia alba dolens. Long periods of standing do undoubtedly tend to the production of varicose veins, and it is therefore important that these prolonged periods should be eliminated by the provision of opportunities for sitting and for moving about. Such opportunities must be in properly balanced proportions, for we have already seen that constant sitting is an important aetiological factor in the production of dysmenorrhoea. Flat-foot is closely related to varicosity in its causation and it can be prevented by the measures already suggested for dealing with the latter condition.

G. Nutrition.

Women are undoubtedly more casual about their food than are men. They tend to rely to a certain extent on their reserve store of fat and, as a class, they do not regard their meals as definite and necessary items in the days proceedings. In the case of the industrially employed woman the results of such a lack of appreciation of the necessity for the taking of adequate meals at regular intervals are fatigue, digestive disorders, and a fall in general efficiency. It is therefore, absolutely necessary that woman's attitude towards her meals should be borne in mind by those having supervision of employed women; but if this attitude is borne in mind, and if the nutrition of the employed woman is supervised and if means are taken to prevent or correct faulty nutritional habits, the tendency to casualness is of itself no bar to the employment of women in general.

H. Psychological Functions.

Although the average female brain at ages 20 to 60 is lighter by 126 to 164 grammes than the average male brain (28, quoted by Collis and Greenwood 8) the female brain bears about the same relation to the body weight as does the male brain. Thompson (29, page 182) says "The psychological differences of sex seem to be largely due to differences in the social influences brought to bear on the developing

individual from early infancy to adult years."
There is no doubt that these differences in social influences are much more potent than are other factors such as size of brain etc.

Mrs Hollingworth (30) puts the position thus "There exist no scientific data to show (i) differences in average intellect; (ii) differences in mental variability; (iii) special causes of intellectual inefficiency affecting one sex but not the other; (iv) differences in effective or instructive equipment, implying a 'natural' division of labour. The division of labour between the sexes, which has existed through historic times and still persists, originated, so far as we know, in physiological, not in psychological differences."

It might be contended by those who agree with Breuer & Freud regarding the causation of the psychoneuroses that, as an individual who has suffered a sexual psychic trauma in early life is much more liable to develop hysteria if later in life circumstances prevent the free play of the normal sex impulse, the employment of women may, in so far as it postpones or bars marriage, be a factor in the causation of hysteria. Assuming that the premises upon which this contention is bases are true, we must admit that the nemerical superiority of the female sex is an infinitely more potent cause of female celibacy in a monogamous society

than is employment of women. If we admit this, it follows that employment of unmarried women is of relatively little importance in the causation of psychoneurosis and that even if such employment does occasionally in particular cases tend towards the production of hysteria, these cases furnish no good argument against the employment of young unmarried women in general. The tendency must however be remembered by all industrial welfare workers so that other causes of hysteria which are more under immediate control may, so far as possible be eliminated.

I. The Effect of Lead upon the Health of Women.

Opinions differ as to whether or not females exhibit a sexual proclivity to lead poisoning. Collis and Greenwood (8) in speaking of this subject say that they are not satisfied that there is evidence that women fall victims to plumbism more readily than men, and in support of their view they quote the absence of any rise in the incidence of lead poisoning among women when they were allowed temporarily to engage in work in white lead beds during the war period owing to the scarcity of male labour.

On the other hand, in the memorandum (31) on industrial lead poisoning issued by the Home Office in January 1921 we have "The susceptibility of women to the influence of lead is usually accepted as being greater than that of men. Figures in the pottery industry

seem to shew that women are about twice as susceptible as men." Whatever the truth regarding this matter may be there is no difference of opinion as to the harmful effects of lead upon the uterine functions as such and Collis and Greenwood (8) admit that "the effect of plumbism in causing miscarriage and still-birth is a sufficient reason for excluding females from exposure to lead dust." The memorandum of the Home Office puts the matter thus:- "Disorders of menstruation are common, the tendency to miscarriage in some lead workers is so pronounced that only after giving up the work altogether can full term be reached." Hope, Hanna and Stallybrass (19, page 92) say "Females suffer from severe forms (i.e., of plumbism) with excessive menstruation and tendency to miscarriage in those who are pregnant." Sir Thomas Oliver (32) states "In female lead workers menstruation is increased; in those who are pregnant the tendency is for miscarriage to take place. The only possible way for a pregnant female to reach full term is to retire from the work at the earliest possible date. I am disposed to believe that one of the reasons why females are more readily influenced for harm by lead than men is the peculiar action of lead upon the reproductive organs."

Dr Reid (12) quotes the following figures which he obtained in an intensive investigation in the pottery

towns of Staffordshire.

		Percentage of mothers having			Number per 100 mothers.		
	Number of records	Miscarriages	Still births	Miscarriages & Still-births	Miscarriages	Still births	Miscarriages & Still-Births
Factory & other workers (not in lead)	984	9.2	8.4	16.4	26.6	21.o	47.6
Lead workers previous to marriage	121	25.6	6.6	30.6	74.2	11.8	86.0
Lead workers since marriage.	70	30.0	14.3	37.1	99.0	32.8	133.5

These figures shew a higher incidence of miscarriage and stillbirth among women working in lead as compared with other women working in factories but not in lead processes.

Opinions differ as to the mode of action of lead in causing abortion. Legge and Goadby (33, page 36) believe that the abortifacient effect is due to placental haemorrhages. Oliver (34, page 201) ascribes the effect to poisoning of the foetus and stimulation of uterine contraction. W. Blair Bell (35, page 270) holds that lead causes abortion by a specific action

upon the chorionic epithelium.

So impressed were the members of the General Conference of the International Labour Organisation held at Washington in 1919 with the effect of plumbism on the generative organs of women and upon their maternal functions that they made very drastic recommendations with regard to the exclusion of women from taking part in certain lead processes and with regard to their taking part in other specified processes only in the presence of defined precautionary measures. Effect has been given to these recommendations in the "Women and Young Persons (Employment in Lead Processes) Act 1920.

4. The Effect of the Non-Domestic Employment of Women upon the Marriage-rate and Birth-rate, and upon Pregnancy and Infant Mortality.

A. General.

B. The Influence of the Occupation of the Mother upon Abortion and Foetal Death.

(a) Syphilis.

(b) Trauma, Overstrain and the lifting of heavy weights.

(c) Lead, Mercury and Glass.

(d) Accidental Haemorrhage and Retroplacental Haematoma.

(e) Placenta Praevia.

(f) Chronic Renal Disease.

(g) Backward Displacement and Prolapse of the Uterus.

(h) Albuminuria and Eclampsia.

(i) The use of Abortifacient Drugs and Mechanical Interference.

(j) Observations made by Dr M. A. S. Deacon.

C. Infantile Mortality.

A. General.

Any opinions formed regarding the influence of the non-domestic employment of women upon the marriage-rate etc. must be largely speculative, as data for the formation of an exact assessment are lacking. With regard to the marriage-rate, it may be argued that as the employment of unmarried women will bring them into contact with males such employment will tend towards an increase in the marriage-rate and a lowering of the average age at marriage. Moreover, as the employed woman is already a bread wimner and more or less self supporting, if she intends carrying on her occupation after marriage the possibility of her making regular and considerable contributions to the family exchequer would enable marriage to be entered upon sooner than if there was no such possibility of her contributing to the general household funds.

Short of any contribution she might make after marriage, the fact that she is working prior to marriage would enable joint savings to accumulate more rapidly and so hasten the date at which a home could be got together.

The effect of an unmarried woman being in gainful employment in hastening marriage would be most marked in instances in which the husband's wage was small, and it might be anticipated that this effect in hastening marriage and lowering the average age at marriage would diminish as the husband's wage increased in amount. So we see that the effect of the gainful employment of women upon the marriage-rate must vary with the average male wages in vogue in the district under consideration.

On the other hand it may be argued that a woman in a reasonably well paid occupation has less inducement to marry early than an unoccupied woman.

As there are so many complicating social factors which influence the marriage-rate much more than non-domestic employment of women can influence it, any effect which this latter factor may have would be largely obscured by the other and more dominant factors, and personally I believe that employment of women has relatively little effect upon the marriage-rate.

When one comes to the consideration of the

birth-rate the position is slightly different, as a woman in gainful employment might not wish to have her wage-earning interfered with by childbearing and might take measures to prevent pregnancy or to terminate it prematurely. This aspect of the subject will be considered more fully when we are dealing with abortion and stillbirth.

Displacements of the uterus (including uterine prolapse and vaginal hernia) are definite aetiological factors in the production of sterility and it has been already shewn how multiparity, excessive strain, bad hygienic surroundings and under-nourishment enter into the causation of such displacements. Therefore the employment of women, and especially of multiparous women, in work beyond their strength, and particularly when such work is carried on under bad conditions and in the presence of under-nourishment, must tend towards the causation of sterility. But there exists no evidence to shew that work which is within the strength of the individual woman concerned and which is not associated with the several conditions mentioned has any influence on a woman's fertility.

B. The Influence of the Occupation of the Mother upon Abortion and Foetal Death.

Does the non-domestic employment of women tend to increase abortion and so-called stillbirth? In the following paragraphs the causes of abortion and foetal death which may be influenced by non-domestic employment are considered.

(a) Syphilis

Although individual sets of statistics shew varying figures regarding the extent to which syphilis enters into the causation of abortion and foetal death, all figures agree that the extent is a considerable one. Amand Routh (36) when giving evidence before the Royal Commission on Venereal Disease stated his belief that about fifty per cent. of all foetal deaths are due to syphilis. On the other hand Eardley Holland (37) in his report to the Ministry of Health on the causation of foetal death found such death to be due to syphilis in 16 per cent. of his cases, and Whitridge Williams (38, page 26) found syphilis responsible for 14 per cent. of foetal deaths among white women admitted to the Johns Hopkins Hospital.

I know of no figures which bear upon the incidence of syphilis among industrially employed women; but it is generally admitted, I think, that syphilis is most rife in large urban aggregations of population. Neglecting for the moment agricultural

employment of women, it is in large urban areas that non-domestic employment of women is most marked and it is therefore conceivable that the industrial employment of women may have some influence in increasing the incidence of syphilis in a community. On the other hand, syphilis in the father being the common state of affairs in abortion due to syphilis (the mother generally shewing no frank evidences of syphilis other than a series of abortions and a positive Wassermann reaction) it may be that employment of women by diminishing the degree of their state of parasitism and increasing their independence would diminish the general incidence of syphilis and so decrease the number of abortions from this cause.

(b) Trauma, Overstrain and the lifting of Heavy Weights.

These are commonly admitted causes of premature termination of pregnancy which might conceivably be increased in frequency by industrial employment of women. "Miscarriages due to overstrain or heavy work are most common during the first three months; towards the end of pregnancy there is an increased risk of premature birth etc, if the woman remains too long at heavy work." (19). The industrially employed woman obviously runs greater risk of injury and excessive tiredness than a woman not similarly employed

But if the work of the industrially employed woman be properly adjusted to her capacity, the work carried out by a woman in organised industry in general or in a factory in particular, need not be of such a character as to make her tend to abort. It is all a question of adjustment and grading. If the work of pregnant women be not graded one would anticipate an increase in abortion due to fatigue etc. But Deacon's figures (39) which will be given fully later on, lead one to believe that where proper grading is adopted no such increase need be anticipated.

(c) Work in Lead, Mercury and Glass.

The action of lead in producing abortion has been already mentioned and there is evidence to shew that employment of women in glass manufacture and in various operations dealing with mercury has a similar effect. (27, page 143)

(d) Accidental Haemorrhage and Retroplacental Haematoma

These conditions were the cause of foetal death in 12 per cent. of Eardley Holland's (37) series of 300 cases, so that as causes of foetal death they rank fairly high. With regard to the aetiology of accidental haemorrhage Eden (27, page 324) says "Considerable uncertainty still exists as to the relative importance of injury and disease in causing

separation of the normally situated placenta. Instances are rare in which it can be attributed solely to direct injury, e.g., a kick on the abdomen or a fall; but there is no doubt that such injuries may cause separation of a healthy placenta from it's normal attachments. It is probable that a sudden rise in intra-abdominal pressure, such as an unusual muscular effort or severe vomiting, may detach the placenta, when local disease which would weaken it's attachments exists, and therefore in these cases both injury and disease are factors in causation. In other cases the haemorrhage is absolutely spontaneous and must be attributed solely to disease.....The following diseases are believed to be the most important; chronic Bright's disease, anaemia, purpura, syphilis, cardiac disease (especially mitral lessions)....."

The causation of retroplacental haemorrhage is probably somewhat similar.

Occupations therefore which increase the risk of trauma and which tend to cause nephritis or anaemia etc. might be expected to lead to premature emptying of the uterus from accidental haemorrhage in certain cases.

(e) Placenta Praevia.

The aetiology of this condition is obscure and there is no reason to believe that the foetal death-rate due to this cause is increased by industrial employment.

(f) Chronic Renal Disease.

Chronic nephritis was the cause of 1.3 per cent. of foetal deaths in Eardley Holland's series(37). Eden (27, pages 135, 136, 144) says "The disease usually causes the pregnancy to terminate prematurely, tends to destroy the foetus by inducing placental degeneration, and may cause the death of the mother from uraemia.....The foetal mortality in chronic nephritis is very high indeed. Women who are the subjects of Bright's disease often sustain a succession of abortions without carrying any pregnancy to term."

Among the important causes of renal disease are chill, overwork and, among chemical agents, turpentine, potassium chlorate, carbolic acid, lead, mercury, alcohol. (21, page 569 et.seq.) and one may argue that occupations which lead to the exposure of women to these causative factors will increase the risk of premature termination of pregnancy but no figures in support of this argument are available.

(g) Backward Displacement and Prolapse of the Uterus.

We have already seen that both these conditions may be caused by overstrain. Both are fruitful causes of abortion. Eden (27, page 93) in speaking of backward displacement of the gravid uterus, makes it clear that a normally placed uterus may become

displaced during the first or second month of pregnancy by a fall or a violent muscular effort, and (page 95) he states that "Commonly abortion takes place if the displacement remains uncorrected." The same author (page 101) in dealing with prolapse of the gravid uterus shews that if spontaneous ascent does not take place about the third month abortion will almost inevitably occur.

(h) Albuminuria and Eclampsia.

In Eardley Holland's series (37) these conditions were responsible for 9 per cent. of foetal deaths.

The following quotations from Eden (27, pages 81 and 84) deal with the effect of albuminuria and eclampsia upon pregnancy and with the causation of these diseases. "A heavy foetal mortality, probably over 50 per cent., attends the albuminuria of pregnancy .....It is practically certain that the immediate cause of the albuminuria of pregnancy is to be found in the degenerative changes in the renal cortex. These renal changes are no doubt usually set up by a morbid condition of the maternal blood.....The precise nature and origin of the morbid condition of the blood must be regarded for the present as unsettled; the nature of the toxic bodies is unknown, but they are in all probability of maternal, not foetal origin."

Though no figures are available I hold it to be conceivable that a toxic condition of the maternal blood would be especially liable to occur if women are employed under bad hygienic conditions.

(i) The use of Abortifacient Drugs and Mechanical interference.

There is a considerable body of opinion to support the view that there is a great tendency for pregnant married women workers to attempt to terminate pregnancy prematurely and Deacon (39) holds that this tendency is increased if the woman fears that she will be dismissed on account of her condition. Deacon emphasises this last point particularly and holds that if this fear is removed the chances of women attempting abortion will be very greatly diminished. It is obvious that the birth of a child will interrupt a woman's work and if this interruption is regarded by the woman as being highly undesirable, it is certain that she will use such means as she may know of to prevent her from going to term. We are not here considering the case of the woman who wishes to abort for the reason merely that she does not wish to have an addition to her family. Such a woman will attempt abortion (according to her knowledge of abortifacient methods) whether she is employed or not. The influence of employment upon the incidence of abortion

due to interference by drugs or instruments must be almost entirely a question of the manner in which a birth and puerperium will interfere with employment. Though the prospect of"an extra mouth to feed" may have some influence, the interruption of work is the prime factor. It therefore follows that if means are taken (1) to assist the woman (by grading of work etc) to remain at her occupation as long as possible and (2) to keep her place open for her till she can return after confinement, the use of abortifacient methods should be much diminished.

(j) Observations made by Dr. M.A.S.Deacon.

Dr. M. A. S. Deacon (39) gives the results of some interesting observations which she made while acting as medical officer in a national filling factory in which 1197 females (575 married and 622 single) were employed, and Dr Deacon has been good enough to supplement by a personal communication the information contained in her paper as published. The employed women in this factory were for the most part of a bad physical type. The majority of them were undersized and badly developed and when taken on to work most of them had carious teeth and many of them were anaemic. The hygienic conditions and the supervision exercised at this factory were highly creditable to those responsible. The buildings

were well ventilated, sanitary and bath accommodation was satisfactory and good abundant food was provided at a moderate price at a factory canteen. A covered way was provided to protect the workers from inclement weather conditions in their walk of a mile to and from the factory. In addition, there was a well organised medical service, the medical officer was given opportunities for grading work according to physical capacity, and means were taken to remove carious teeth before the commencement of employment. Many of the married women employees did their own house work in addition to their strenuous work at the factory. Deacon records that after about six weeks employment the women became more robust, less anaemic, and much better in every way; and she gives the following interesting figures. During the period of observation there were 101 pregnancies among the 575 married women. Of these 65 terminated successfully with 66 children (there being one set of twins), 13 terminated in early abortion, there were 2 premature births, 15 had not terminated at the time the observations ceased, and six cases could not be traced. Of the two premature births both were eight months children, one being born dead and the other born alive and surviving for sixteen days. With regard to the 15 cases which had not terminated and the 6 cases lost sight of, there is no reason to believe that they terminated in early abortion as they

had been under observation for some time. I think that the chances of any of these 21 pregnancies terminating in stillbirth (or dead birth late in pregnancy) are small, as of the known 80 cases only two terminated in premature birth. However, if one allows that one of these 21 cases terminated in stillbirth we shall, I think, be making a reasonably fair allowance.

Of the fifteen known cases of premature termination of pregnancy, 6 were due to causes definitely not associated with the factory work and the causes could not be determined in the other 9 cases. In none of the cases was there any reason to believe that the employment was a causative factor. What it comes to therefore is this, that in Deacon's series of 101 pregnancies among employed women there were rather less than 13 per cent. of abortions and between 1 and 2 per cent. of stillbirths.

How do these rates observed by Deacon among factory employed women compare with the abortion and stillbirth rates shewn by married women generally? The abortion and stillbirth rates quoted by various authors differ slightly. The highest I know of are those of J. W. Ballantyne (40) and T. W. Eden (27) and the lowest those of Herman Schwarz (41) and Comyns Berkeley (42). Ballantyne postulates an abortion-rate of 12 to 15 per cent. of conceptions and a stillbirth-rate of 3 to 4 per cent. of living

births. Eden (27, page 143) quoting figures presented by Professor Malins to the Obstetrical Society of London says "It appears that in this country about 16 per cent. of pregnancies terminate in abortion, i.e., that one abortion occurs to every five births of viable children."

Herman Schwarz (41) found that in a series of 27711 pregnancies investigated by the John E. Berwind, Maternity Clinic, 2239 or 8.07 per cent. terminated in abortion and 413 or 1.49 per cent. in stillbirth. The stillbirth rate per 100 live births in Schwarz's series was 1.64 per cent. Guilfoy (quoted by Schwarz) gives the stillbirth rate for New York as varying from 4.3 to 4.9 per cent. of births during the years 1915 to 1919. Comyns Berkeley (42) states that it is estimated that the total of intra-uterine deaths equals the total deaths of children during their first year of life.

It will therefore be seen that the percentages shewn in Deacon's series of cases (namely rather under 13 per cent. of early abortions and between 1 and 2 per cent. of stillbirths) while they are rather higher than the lowest figures quoted above are yet not so high as the highest. The general conclusion one may draw from Deacon's figures is that so far as her particular series is concerned the figures shew that well regulated industrial employment of women does not

necessarily lead to an increased abortion and stillbirth rate.

C. Infantile Mortality.

The exact effect of the non-domestic employment of women(and especially of married women) upon the infantile mortality rate is very difficult to gauge.

Dr Reid (43) County Medical Officer for Staffordshire investigated the subject and in his annual report for 1909 published a table shewing the infantile mortality rates in different groups of artisan towns in the administrative county, the towns being classified according to the proportion of married women workers in each. The grouping in this table is based upon the number of employed married and widowed females in relation to the total female population between the ages of 18 and 50 years at the 1901 census. These data were specially extracted by the Registrar General. The infantile mortality rates quoted are those of the 29 years 1881 to 1909.

The following is the table:-

Class according to percentage of Married and Widowed workers to Female population between 18 & 50 years.	No. of Towns	Total population, 1901 Census	Deaths of infants under 1 year per 1,000 registered births.		
			1881-1890	1891-1900	1901-1909
1. 12% and over	5	132,299	195	212	186
2. Under 12% and over 6%	13	263,868	165	175	152
3. Under 6%	8	131,508	156	168	139

On looking at the table it will be seen that in all cases the infant mortality rate is high or low accordingly as the employment figure is elevated or depressed.

In the same report Reid gives the results of a special intensive investigation relating to the twelve months history of infants born in 1908 into artisan families in the towns of Hanley, Stoke, Tunstall, Burslem, Longton, and Fenton (since federated to form the County Borough of Stoke-on-Trent). Reid states that in these families "poverty was conspicuously absent, and the standard as regards home conditions was remarkably uniform." The following table shews the infant mortality of the infants of mothers who

remained at home, contrasted with the mortality of the infants whose mothers were employed away from home (in factories etc):-

Class	No.of births in 1908	Deaths under 1 year	Deaths under one year per 1,000 births
Home Mothers	3,150	462	146
Mothers working in factories and away from home during the day.	1,125	236	209

This table shews that the mortality of the infants of mothers employed away from home was some 43 per cent. higher than that of the infants of mothers who were not so employed. Reid attributes the differences in the two classes to the greater degree of breast feeding among the home mothers and in support of this contention he gives the following table:-

Incidence of Mortality among Infants who survived the first month of Life, classified according to nature of Food

	Breast wholly	Breast partly	Artificially wholly.
Number surviving first month	2,429	932	457
Number of those dying under one year	235	162	114
Deaths under 1 year per 1,000 infants who survived first month	97	174	249
Percentage increase over Breast fed.		79%	157%

Only those infants who lived more than one month are included in the above table because it was found that the great majority of the employed mothers suckled their infants during the first month or so ------ the factory mothers during the month they were by law compelled to remain at home, and the other outworking mothers during the two or three weeks or more which they spent at home after confinement before resuming work.

In a paper Julius Levy (44) points out that in the United States of America the infantile mortality rate among the coloured people is two or three times as high as that of the whites.

According to this author if we analyse " the percentage of coloured and white women in gainful industry, particularly the percentage of women in the age group 25 to 34 and more particularly of these that are married, we find that there is a sharp drop among the white from the previous age group of 19 to 24, while there is no reduction at all among the coloured. Indeed, an examination of the census reports shews that the percentage of coloured women in employment is practically very little affected by age or marital condition." Furthermore , Levy shews that the percentage of women in industry and particularly of married women aged 25 to 34 is much higher in the Southern and Eastern sections of the United States

than in the Northern and Western. The highest infant mortality rates in the United States are in the Southern and Eastern sections, the lowest in the Northern and Western. Levy also holds that if an analysis is made of the infantile mortality rates of large and small cities and even rural communities, the same association of high infant mortality with a high percentage of employment of married women is found. "On the other hand, towns and cities in Pennsylvania may be without sewage disposal or health supervision, with unsanitary streets and bad housing, and still have a low infant mortality rate."

S. G. Thompson (45) draws attention to the lower infantile mortality rate of children of white parents as compared with the rate of coloured infants in Florida (where the coloured form 40 per cent. of the population) and in the Registration Area of the United States as a whole. He attributes the higher rate among the coloured in the case of Florida, at least in part, to the neglect and improper, irregular or under feeding of infants which is associated with the type (potato digging) of work indulged in by coloured mothers in the State.

Julia C. Lathrop (14) found that in Manchester, New Hampshire, where there is a great demand for women workers in the textile trades, the infantile mortality rate for the babies of the mothers at home

and with no employment save that of caring for their households was 122.0 while that for the babies of mothers employed outside the home was 312.9. The total number of mothers in Lathrop's series was 1564, 679 of them being employed and 885 not employed.

In 1908 Dr Robertson (11) carried out in his area an intensive investigation of the same character as that undertaken by Reid (12). The results of the investigation are given in a special report which forms part of the Birmingham Annual Health Report for 1909. The investigation related to 1212 mothers, 611 (50.4 per cent.) being industrially employed during pregnancy and 601 (49.6 per cent.) not so employed. With regard to employment of the mother after birth of the child and while the child was still alive, 31.5 per cent. of the mothers were industrially employed and 68.5 per cent. were not so employed.

The home conditions of the women industrially employed did not differ to any large extent from that of the women not so employed and therefore the two groups were strictly comparable. The district chosen for the enquiry had an estimated population of 41,884 and it was completly occupied by works and small dwelling houses. The social conditions prevailing will be realized from the statement that in 15 per cent. of the homes visited during the investigation the woman's husband was out of work at the time of the visit of

enquiry and that Robertson estimated that in the area at least 50 per cent. of married women went out to work at some time in their married life.

Robertson's investigation shewed:-

1. That the mortality of infants of mothers who were employed either before or after childbirth was at the rate of 190 per 1,000 births, while the mortality among the infants of non-employed mothers was 207 per 1,000 births.
2. The mortality of the infants of mothers who were employed during pregnancy was exactly the same (198) as that of infants whose mothers did not work.
3. Among the children of mothers who were industrially employed after confinement the mortality rate was 139 per 1,000 births, while among those whose mothers were not so employed the rate was 225.

Robertson concludes that " Taking into consideration our previous investigations on somewhat similar lines, it may be said that in Birmingham the type of industrial employment in vogue does not appreciably influence the health of the mother or her infant when the standard of comparison is that of women in equally poor circumstances who are not employed industrially. While this is the opinion I have come to from an

investigation of the facts in these poverty-stricken districts, I do not for a moment maintain that such industrial employment is free from all harmful influence. The mere fact that it prevents breast-feeding in the majority of cases is in my opinion a reason for some State interference. Here, however, it appears to be a question in this Birmingham area as to whether the additional poverty which would be occasioned by preventing mothers from working for, say, six months after a birth, would not be the greater of the two evils..... Probably the factory or workshop employment in itself is in the majority of cases not more exacting on a pregnant women than that which the mother of a large family has to perform daily at home.

Greenwood (46) carried out an investigation similar to those of Reid (12) and Robertson (11). Greenwood says "Altogether 500 births were investigated throughly, and each infant was visited soon after birth, and revisited many times subsequently. These births are associated with 314 mothers industrially employed in factories, and with 175 mothers not industrially employed. In three cases the mothers were industrially employed at home. Amongst these 500 births there were eight sets of twins, and therefore 498 mothers altogether were represented amongst these 500 children born in the year 1908. Amongst the above 314 mothers industrially employed, 13.5 per cent.

of the infants died in the first year of life. Amongst the 175 mothers not industrially employed 12.2 per cent. of the infants died in their first year. It would appear from this fact, therefore, that there was only a small difference in the deaths of children, in their first year, belonging to the mothers industrially employed and to the mothers not industrially employed respectively. This difference was slightly in favour of the latter group to the extent of 1.3 per cent.....As a result of this investigation, I came to the conclusion that no case had been made out for further restrictive legislation in the prohibition of employment of women in the cotton mills of Blackburn."

In a special report on infant and child mortality Dr Newsholme (47) the then Medical Officer to the Local Government Board after reviewing various statistics comes to the conclusion that the most that can be infered from these figures is that the industrial employment of married and widowed women cannot be regarded as, in itself, the chief cause of excessive infant mortality. Dr Newsholme says " Thus Glamorgan and Northumberland (31 each), Durham (26), and Monmouth (38) have the lowest proportion of industrially employed married and widowed women of all the thirty counties under consideration. They have also the highest infant mortality.

Lancashire (85), Staffordshire (65), and the West Riding of York (57), have high proportions of occupied wives and widows, with a high infant death-rate; Gloucester (75), Berks (70), Oxford (68), and Hereford (67), have high proportions of occupied wives and widows, with a low infant mortality.....It is likely that the absences from home are less protracted in the last named counties, than in the counties of the textile and pottery industries." (Note. The figures in brackets indicate the number of married and widowed women engaged in occupations, per 1,000 females aged 10 years and upwards.)

I am not aware of any previously published figures which relate to a comparison between county boroughs in the same administrative county as regards the degree of female employment obtaining and the infantile mortality rate experienced. The tables which follow relate to the six county boroughs of Staffordshire - Burton, Smethwick, Stoke, Walsall, Wolverhampton, and West Bromwich.

The percentages of employed females have been calculated from figures in the County of Stafford Volume of the Census Report of 1921. The mortality rates have been calculated from numbers for the years 1910-1922 kindly supplied by the Medical Officers of Health for the several county boroughs. The mortality rates selected are the total infantile

mortality, the infantile mortality during the first month (the neonatal mortality rate) and during the first week, and the rate due to prematurity, atrophy, debility, and marasmus (the "developmental and wasting diseases" of the Registrar General's reports.)
These rates were selected as being, in the opinion of the writer, the most likely to furnish a true index of the effect of the non-domestic employment of women upon infantile mortality in general and upon it's more important components. For the investigation the county boroughs of one county were selected as being subject to much the same climatic conditions, and the county boroughs of Staffordshire seemed to be specially suitable for such an enquiry as, while in all the sanitary standard is pretty much the same, in some (e.g., Stoke) many women are industrially employed while in others (e.g., Burton) few work out. In addition there are towns intermediate between the two extremes. The period chosen for the calculation of the various mortality rates was limited by the fact that the County Borough of Stoke came into corporate being only in 1910 and the writer was anxious to include this County Borough as it has one of the highest female employment figures in the Country.

Table 1. (page 64) shews the employment percentage of married women; of married, widowed and divorced women, and of the total female population

aged 12 years and over in each of the six county boroughs of Staffordshire together with the infantile mortality rates, and the selected components of that rate.

Table 2. (page 65) shews the county boroughs set out in the order of their employment figures of married and widowed women and in the order of their infantile mortality rates under the various heads already specified.

Table 3. (page 66) shews the county boroughs set out in the order of their employment percentages of the total female population aged 12 years and over and in the order of their infant mortality rates under the various heads.

In carrying out this investigation, as well as making the analysis applicable to all occupations (see tables 1, 2, 3) I selected the occupations classified 1-22 and 29-31 in the Census Report 1921 (see tables 4, 5,&6,) as being the most arduous employments in which women are engaged, as I thought that one might anticipate that an analysis according to these occupations would give more definite results than an analysis taking into account all the occupations of women.

Table 4. (page 67) shews the percentages of females in each of the county boroughs employed in

occupations numbered 1-22 inclusive and 29-31 inclusive in the Census Report 1921 together with the infantile mortality rate of each County Borough.

Table 5. (page 68) shews the county boroughs set out in the order of their employment percentages of married, widowed and divorced women and of married women alone, engaged in occupations 1-22 and 29-31 and in the order of their several infantile mortality rates.

Table 6. (page 69) shews the county boroughs set out in the order of their employment percentages of total female population aged 12 years and upwards engaged in occupations numbered 1-22 and 29-31 inclusive, together with the order of their infantile mortality rates.

Consideration of these tables shews a general (but only a general) co-relation between female employment figures and the infantile mortality rates calculated, and there are points at which the co-relation breaks down. Thus looking at the tables 1, 2 and 3, one sees that the town(Burton) with the lowest employed women figure has the lowest infantile mortality and neonatal death rate. It's first week rate and it's rate from prematurity, atrophy, debility and marasmus are higher only, than in the case of the

former, Wolverhampton (excess only .22), and, in the latter, Smethwick (excess only 1.75) and Wolverhampton (excess 5.27).

The town (Stoke-on-Trent) with the highest employed women figures has the highest total infantile mortality and the highest rate from prematurity, atrophy, debility and marasmus. It's neonatal rate is exceeded only by that of Walsall (shortage 4.39) and it's first week rate by those of Walsall (shortage 4.87) and Smethwich (shortage 1.43)

On comparing the various tables it will be seen that there is little difference between the results obtained whether one takes into consideration all the occupations of women or those classified 1-22 and 29-31. It will also be seen that there is equally little difference if one takes as a standard the employment percentages of women married, widowed and divorced or if one uses as a standard the percentage of all employed females aged 12 years and over.

T A B L E. 1.

1910 ------- 1922

Town	Percentage of married women of all ages employed	Percentage of married, widowed, and divorced women employed	Percentage of Total Female Population aged 12 & over who are employed	Infant Mortality	Infant Mortality due to Prematurity Atrophy, Debility & Marasmus	Infant Mortality from all causes under the age of one Month	Infant Mortality from all causes under the age of one week.
Burton	4.4	7.2	27.4	81.94	36.13	38.25	23.93
Smethwick	9.3	12.1	34.6	103.76	34.38	42.37	27.95
Stoke-on-Trent	21.93	23.5	43.7	136.53	45.99	44.5	26.52
Walsall	9.6	12.4	33.3	120.95	43.09	48.89	31.39
West Bromwich	5.4	7.99	29.1	112.66	38.19	41.4	25.73
Wolverhampton	8.04	11.3	32.3	103.79	30.86	39.4	23.71

T A B L E. 2.

Order of percentage of employment of Married, Widowed, and Divorced Women and of Married Women alone	Order of Total Infantile Mortality	Order of Infantile Mortality due to Prematurity, Atrophy, Debility & Marasmus	Order of Infantile Mortality under the age of one Month	Order of Infantile Mortality under the age of one week.
Stoke	Stoke	Stoke	Walsall	Walsall
Walsall	Walsall	Walsall	Stoke	Smethwick
Smethwich	West Bromwich	West Bromwich	Smethwick	Stoke
Wolverhampton	Wolverhampton	Burton	West Bromwich	West Bromwich
West Bromwich	Smethwick	Smethwick	Wolverhampton	Burton
Burton	Burton	Wolverhampton	Burton	Wolverhampton

T A B L E. 3.

Order of percentage of total Female Population aged 12 years and over who are Employed	Order of Total Infantile Mortality	Order of Infantile Mortality due to Prematurity, Atrophy, Debility and Marasmus	Order of Infantile Mortality under the age of one Month	Order of Infantile Mortality under the age of one week.
Stoke	Stoke	Stoke	Walsall	Walsall
Smethwick	Walsall	Walsall	Stoke	Smethwick
Walsall	West Bromwich	West Bromwich	Smethwick	Stoke
Wolverhampton	Wolverhampton	Burton	West Bromwich	West Bromwich
West Bromwich	Smethwich	Smethwich	Wolverhampton	Burton
Burton	Burton	Wolverhampton	Burton	Wolverhampton

T A B L E. 4.

Town	Percentage of married women of all ages employed in occupations 1-22 & 29-31	Percentage of married, widowed, and divorced women employed in occupations 1-22 and 29-31	Percentage of Total Female Population aged 12 & over who are employed in occupations 1-22 & 29-31	Infant Mortality	Infant Mortality due to Prematurity Atrophy, Debility & Marasmus	Infant Mortality from all causes under the age of one month	Infant Mortality from all causes under the age of one week.
Burton	.719	1.087	9.789	81.94	36.13	38.25	23.93
Smethwick	4.32	5.27	19.011	103.76	34.38	42.37	27.95
Stoke-on-Trent	17.638	17.54	32.243	136.53	45.99	44.5	26.52
Walsall	5.256	6.183	18.816	120.95	43.09	48.89	31.39
West Bromwich	1.851	2.652	15.774	112.66	38.19	41.4	25.73
Wolverhampton	3.187	3.948	12.95	103.79	30.86	39.4	23.71

T A B L E. 5.

Order of percentages of married, widowed and divorced women and of married women alone employed in Occupations 1-22 and 29-31.	Order of Total Infantile Mortality	Order of Infantile Mortality due to Prematurity, Atrophy Debility and Marasmus.	Order of Infantile Mortality under the age of one month	Order of Infantile Mortality under the age of one week.
Stoke	Stoke	Stoke	Walsall	Walsall
Walsall	Walsall	Walsall	Stoke	Smethwick
Smethwick	West Bromwich	West Bromwich	Smethwick	Stoke
Wolverhampton	Wolverhampton	Burton	West Bromwich	West Bromwich
West Bromwich	Smethwick	Smethwick	Wolverhampton	Burton
Burton	Burton	Wolverhampton	Burton	Wolverhampton

TABLE. 6.

Order of percentages of Total Female Population ages 12 years and over who are employed in Occupations 1-22 and 29-31	Order of Total Infantile Mortality	Order of Infantile Mortality due to Prematurity, Atrophy, Debility and Marasmus.	Order of Infantile Mortality under the age of one month	Order of Infantile Mortality under the age of one week.
Stoke	Stoke	Stoke	Walsall	Walsall
Smethwick	Walsall	Walsall	Stoke	Smethwick
Walsall	West Bromwich	West Bromwich	Smethwick	Stoke
West Bromwich	Wolverhampton	Burton	West Bromwich	West Bromwich
Wolverhampton	Smethwick	Smethwick	Wolverhampton	Burton
Burton	Burton	Wolverhampton	Burton	Wolverhampton

Conclusions.

1. There is no reason to believe that the health of women engaged in non-domestic employment in general is injured by such employment, provided the work is not beyond their strength, that it is not carried on under bad hygienic conditions and that it is not of the injurious types mentioned later.

2. Work which is too heavy, and particularly when such work is carried on under bad hygienic conditions, may lead to uterine displacements, which in turn tend towards the production of sterility or premature termination of pregnancy. Multiparous women are more liable to such displacements than the nulliparous.

3. Menstruation is not adversely affected by physical work provided that periods of sitting and standing are not too prolonged.

4. In dealing with industrially employed women means should be taken to combat the casual nutritional habits of the female sex.

5. Varicosity of the veins is caused by prolonged standing, and as this condition is specially important in women, prolonged standing should not be permitted.

6. Plumbism in women is a definite cause of abortion. Work in mercury and glass also tends to cause premature termination of pregnancy.

7. Nephritis is a cause of abortion and women should be barred from engaging in occupations which definitely predispose to this disease.

8. In endeavouring to assess the effect of the employment of women upon the infantile mortality rate we must have regard to what the financial circumstances of the home would be if the mother were not a wage earner. In cases in which there is no real economic necessity for the work of the mother, the apparent effect is the raising of the infantile mortality rate. In cases in which there is economic necessity, such an effect is not evident and indeed the effect may be the reverse, i.e., the infantile mortality rate may be lowered.

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